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An integrated framework for the measurement of halal good manufacturing practices on the case of SMEs in the food sector

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Abstract

Purpose – Nowadays, the Good Manufacturing Practice (GMP) in Indonesia with the product's need for halal certification is limited. The purpose of this paper is to measure the integrated framework of Halal Good Manufacturing Practices (HGMP) in small and medium-sized enterprises (SMEs) and to discover the effect of its performance in the food sector.

Design/methodology/approach – This research conducted focus group discussion in 2 locations with 8 experts and 73 SMEs in the food sector at 2 Indonesian Government agencies.

Findings – The study indicated 6 variables and 40 indicators on HGMP and its implementation in each agency. Two agencies in this research were categorized as poor, which indicated the need to increase the implementation of HGMP. For the SMEs' business process policy, there were significantly different variables in the building, employee, storage and maintenance.

Research limitations/implications – The implementation of the HGMP is examined in this research based on government regulation. It has not been thoroughly tested based on consumer responses. Furthermore, it can consider consumer satisfaction in the halal framework of GMP.

Practical implications – Government agencies in Indonesia can measure the implementation of HGMP in food sector SMEs and guide SMEs to achieve halal quality standards.

Originality/value – This research provides an integrated framework for measuring HGMP in SMEs guided by the Indonesian Government's agency in meeting the standard of halal products.

Keywords Indonesia, Halal, Food sector, Good Manufacturing Practice, Small–medium business enterprise

Paper type Research paper

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Introduction

Small and medium-sized enterprises (SMEs) in the food sector have many challenges to increase productivity. Fung *et al.* (2018) and Petrescu *et al.* (2020) explained that the food industry is complex, and it has a high-quality standard for consumption because of the health factor and consumer product safety. To improve the quality of SMEs services in the food sector, the Indonesian Government needs to resolve this issue into a national priority program. One of the Indonesian Government's policies is to support the process of halal certification for SMEs in the food sector to gain high trust from consumers. Halal certification is a guarantee of product quality that was consumed based on the result of an audit in the production process. The Indonesian Ministry of Religious Affairs issues the halal certification in Indonesia. The process of halal certification for SMEs in the region is registered through a representative office of the Ministry of Religious Affairs in the province. Then, the determination of halal products is released through the Indonesian Ulema Council (MUI).

Moreover, MUI is an independent organization to educate society in raising awareness and participation to propose halal certification. In terms of organizational policy, the MUI has an organizational structure until Indonesia's city level. The MUI institution's authority is not only to determine the halal status of the product, but this institution also needs to empower and develop SMEs on an ongoing basis. Thus, the MUI needs to conduct guidance to SMEs providing halal products. The regional MUI must carry out the guidance on an ongoing basis to assist halal certification issuance through the quality assurance standard established. A study also revealed that the process of guidance for SMEs is ongoing to improve productivity and business development (Tseng and Tseng, 2019).

SMEs must adjust to existing quality standards based on the halal certification procedure to fulfill Indonesia's customer requirements. There are many obstacles in the food industry in proposing the halal certification process in Indonesia. Therefore, it is necessary to offer an approach to measure the implementation of halal system standardization for SMEs in the food sector. Currently, the food industry standards in Indonesia follow Good Manufacturing Practice (GMP) procedures. It was a guideline that was used to produce good processed food to ensure the product consistently and monitored according to the standard of good quality (Manning *et al.*, 2006; Mendis and Rajapakse, 2009). Nowadays, the Indonesian Government's GMP quality standards are helpful to minimize the risks to ensure food safety, quality and nutrition. It increases consumers' loyalty and the safety of consumers, and it enhances the company's top brand name in the business market. Therefore, it is necessary to review an approach to identify the implementation of GMP for SMEs in the food sector to measure the level of execution in the preparation of the halal certification process. To study the implementation of GMP using the halal concept, a framework is needed to solve this problem. Halal Good Manufacturing Practices (HGMP) is a framework to facilitate SMEs in applying for halal certification in Indonesia. Thus, the research question needs to be solved in this study on how to develop an integrated framework for the measurement of HGMP in the case of SMEs in the food sector in Indonesia.

In Indonesia, MUI has several SMEs that are trained toward the standardization of halal certification. This research aims to measure the integrated framework of HGMP for SMEs in the food sector in Indonesia. Further, this research took the sample size of two MUI institutions in Indonesia to be compared with the different levels of policy strategies in the guidance for SMEs in the food sector. This research was undertaken in one of the provinces in Indonesia. The limitation of the study was conducted at SMEs, which were not halal certified, and it was under the guidance of MUI in the regions. Then, the food sector was chosen in this research following the type of SMEs in Riau. Indeed, this research provides a

framework for measuring the achievement of SMEs, which are under government agencies (MUI) in meeting the standard of halal products in Indonesia.

Concept of halal

Halal has the meaning to justify an action done, allowed, permitted or justified, which is the opposite of the word of haram. Haram means a strict prohibition, and it must be avoided by Muslims as explained in the Qur'an about food that is permitted to be consumed. Halal products are the main or obligatory when choosing food and drink (Soon *et al.*, 2017). Consumers must be selective in choosing food to consume in their daily lives by increasing awareness about halal products. In the research of Ambali and Bakar (2014), the recognition of halal does not only come from the halal label, but health factors also influence it. Halal food will affect the individual's body physically and spiritually (Khan and Haleem, 2016). Furthermore, halal products should not be brought close to non-halal products because of avoiding contamination (Alqudsi, 2014). Islam recommends foods that are forbidden to be consumed, one of which is carcasses because of the decay that forms chemicals and is harmful to human metabolism.

Halal Good Manufacturing Practice in the food sector

All companies or business units apply GMPs because this concept affects the quality of the products produced. For the food sector, this must have a product standard to be of good quality. Most of the studies defined GMP in the food sector focus on two standardization involving health and safety of the product. Arkeman *et al.* (2015) and Wallace *et al.* (2005) pointed out that GMP has been widely used by researchers to be implemented in companies, one of which is in the food industry sector. Consuming food is the consumer's need to get energy because it carries out daily activities. Therefore, it needs food that is appropriately produced to be safe for consumption. Gizaw (2019) and Shendurse and Sawale (2019) stated that food safety is a basic need to avoid dangerous diseases for human health. They also said that food processing needs to develop and introduce food safety standards and regulations to achieve a higher level of food safety. Rafeeque and Sekharan (2018) studied food safety in a seafood factory which was located in the Maldives. His research results recommend that the commitment of management must implement food safety to improve food quality and safety. Furthermore, they found several essential issues with implications for food processing policies, standard developers, benchmarking agencies and customers. In addition, a study also applied food safety interventions to control fruits. Their study found that food safety interventions are able to protect from microbial contamination during the packing process, and it can protect from other bacteria. Thus, the fruit remains fresh up to the hands of consumers (Pietrysiak *et al.*, 2019).

Currently, Muslim consumers' needs affect the growth of the global market in the food sector (Wilson and Liu, 2010). Thus, business managers who provide products must compete in market penetration and business expansion in meeting these consumer needs. Wilson and Liu (2011) state that the general principles of Muslim consumers regarding halal products are the norms in the paradigm of consuming food products that are inherent in consumers. Wilson (2014) also examines the phenomenon of Muslim consumer needs for food products. This study indicates that Muslim consumers' conscience follows the paradigm for consuming halal products based on a series of processes, including raw material selection, maintaining sanitation and hygiene for human health and well-being, use of production equipment, production processes, product packaging and delivery to consumers.

Islamic law through the Al-Quran in al-Baqarah verse 168 and Al-Maidah verse 88 states that Muslims consume foods that are *Halalan Thayyiban*. *Halalan Thayyiban* means consuming foods that are permitted by Islamic law and are suitable for the health of consumers. Furthermore, this concept is interpreted that the food in terms of its composition (substance) is allowed, how to get it right and how to process it well. The concept of *Halalan* according to Islamic law is to avoid materials that are prohibited, including carcasses, blood, pigs and venomous animals. Then, *Thayyiban* means good food and is not contaminated with prohibited substances. It is necessary to find suitable raw materials and good food processing. Furthermore, *Halalan Thayyiban* is integrated with the concept of GMP because to produce good and healthy processed food, proper management and processing are needed. There are several variables in the implementation of GMP to produce food to meet the standard needs of Muslims. Indonesian regulation to the Minister of Industry of the Republic of Indonesia No.75/M-IND/PER/7/2010 revealed that several variables had been developed to evaluate the standardization of GMP. *Building* affects the sanitation and hygiene process to maintain human health and well-being in the workplace. Then, the *facility* for using the equipment in food production activities is ensured to not mix (contamination) with prohibited substances and is clean from bacteria. *Employees* work in a healthy condition and do not transmit disease through food during production. Then, there is no mixing of blood, droplets or waste from the human body into the processed food. *Production* is carried out by selecting good raw materials and sourced from materials that are allowed for consumption by consumers to produce quality products. In addition, the *storage* of raw materials, work in process and finished goods aim to ensure that the product is not damaged and does not expire. *Maintenance* of proper use of facilities and infrastructure not damaged and not corroded. Moreover, the indicators are built from Indonesian regulations related to GMPs based on the scope of this government guideline.

Obviously, the GMP approach to the food sector needs to be extended in meeting the needs of consumers globally. The halal implementation of the concept is universal because Muslims and non-Muslims can consume food products anywhere and anytime. Indeed, previous research studies have adopted GMP in several cases. Then, the concept of halal based on Indonesian Government regulations needs to develop to measure the integrated framework of HGMP for SMEs in the food sector in Indonesia. Thus, the review of a previous study identifies variables and indicators related to the implementation of the concept of halal in the framework of GMP. The previous research is found in Table 1.

Research methodology

This research needs to measure halal concepts based on GMP in the food sector SMEs in Indonesia. MUI is an institution, and it has a function as the guidance of SMEs in Indonesia to ensure products produced are safe for consumption.

Research design

This research aims to find out the implementation of HGMP in SMEs and the level difference of policy strategy in the process of business. The application of GMP is created based on Indonesian regulation to the Minister of Industry of the Republic of Indonesia No.75/M-IND/PER/7/2010 concerning guidelines on how to produce good processed food (GMP). Furthermore, the halal concept applied in this research referred to Halal Product Guarantee's procedure in the Republic of Indonesia Law No. 33 of 2014. This law is formulated based on Islamic law; it is based on the Al-Qur'an, which states that Muslims are obliged to consume halal food. Halal food products consist of raw materials, processed materials, additives and animal support materials permitted under Islamic law. Then,

Table 1.
The indicator on the HGMP

No.	Variable	Indicator	Description	A	B	C	D	E	F
1	Building	Road	The road material heading to the building location	√		√			
		Wall	The wall materials of the building	√		√	√	√	
		Floor	The floor material of the building	√		√	√	√	
		Ceiling	The ceiling materials of the building	√		√	√		
		Door	The door material of the building	√		√	√	√	√
		Window	The window and frame materials of the building	√		√	√	√	√
		Air circulation	The air circulation condition in the building	√			√		√
		Lighting	The lighting tools used in the building	√			√	√	
		Spatial	The spatial condition of the tools, materials and process of the building	√		√	√	√	
2	Facility	Distribution tools	Type of vehicle used to distribute the product to consumers	√					
		Transportation and transfer	The facility used to transport or move the raw materials during the production process	√				√	√
		Toilet location	The distance of toilet location to the production place	√					
		Hand wash facility	The tool used for washing the hand at the production site	√		√		√	
		Waste	Waste management has done	√		√		√	
		Water source	The type of water used for production	√		√	√		
3	Employee	Education	The employee last education						
		Recruitment	Recruitment or total number of the employee based on religion			√			
		Training	Type of training given to employees	√		√	√	√	√
		Health	Limit of employee condition allowed to work	√		√		√	
		Equipment	Uniform equipment for employees	√		√		√	√
		Work attitude	Standard or work rules for the employees	√		√	√	√	√
		Health examination	The care on employees health step by step	√		√		√	

(*continued*)

Table 1.

No.	Variable	Indicator	Description	A	B	C	D	E	F
4	Production	Tools and types of equipment	The type of tools and equipment used for production	√	√	√	√		√
		Raw materials	How to get the raw materials	√	√	√	√		√
		Expiry	The treatment of the product related to the expiry	√		√		√	√
		Policy	The factors causing the business owner to produce the product			√			√
		Packaging	The material of the product package	√	√	√	√	√	√
5	Storage	Location	Location and position of storage place	√	√	√			
		Wide	Shelter wide	√					
		Storage place	The condition of storage place	√		√		√	
		The need for raw materials	The time when the raw materials needed					√	
		Storage of raw materials and product	The place location of raw materials and the product	√	√	√	√		
		Equipment	The storage on the equipment after used	√	√	√		√	
		The place halalness of raw materials and the product	The storage of raw materials and the product		√				
6	Maintenance	Environmental cleanliness	Maintenance of cleanliness around the work environment	√		√		√	
		The cleanliness of the workplace	Cleanliness maintenance on the production site	√	√	√		√	√
		The cleanliness of the raw material vehicle	Cleanliness maintenance of the raw material vehicle	√		√		√	
		Toilet cleanliness	Maintenance of toilet cleanliness	√		√		√	
		Handwash cleanliness	Maintenance of cleanliness and equipment of handwash place	√		√		√	
		Place cleanliness of raw materials and the product	Maintenance of cleanliness on the place of raw materials and the product	√	√	√		√	

Note: A = Indonesian Ministry of Industry (2010); B = Republic of Indonesia Law No. 33 (2014); C = Purwantiningrum *et al.* (2018); D = Amir *et al.* (2019); E = Medeiros *et al.* (2015); D = Dewantara *et al.* (2018)

processed animals must be slaughtered according to Islamic law and comply with the principles of animal welfare and veterinary public health. Islamic law does not allow foodstuffs to be contaminated with prohibited substances including carcasses of animals, blood, pigs and animals slaughtered against the law. Food products must not be damaged and rotten when consumed, so it needs proper storage and packing management. Then, the equipment for processing food ingredients must be clean. Supervisors understand and have concerns about halal products based on Islamic law. Thus, this research conducts the measurement of the SMEs in the implementation of the HGMP framework that aims to support the process of halal certification in Indonesia dealing with the food sector. The framework of HGMP is used to measure the level of implementation of food products having reasonable quality assurance. Thereby, to meet this standardization, variables and indicators are needed to evaluate it. This research reviews several previous studies to select variables and indicators. Table 1 is a previous study related to the variables and indicators used in the halal concept's integrity and GMP. Six variables were measured in this research, including building, facility, employee, production, storage and maintenance for the implementation of HGMP.

Sample and procedure

This research sample was SMEs in Indonesia for the food sector that did not yet have halal certification. MUI, as a halal certification provider in Indonesia, is responsible for monitoring the sustainability of halal business units. Thus, the sample in this research was SMEs under the guidance of MUI in Indonesia. In addition, every province in Indonesia has one MUI institution to provide halal certifications and also every province has several branches to be an agency. Then, the case study in this research took samples from two agencies (MUI) in Riau Province in Indonesia. The first agency was MUI Kampar, which had a dense population level, and the demand for halal certification was limited. The other agency was the MUI Pekanbaru, where the requirement for halal certification was higher because of the encouragement of customers to choose halal-certified products. Besides, non-probability sampling was adopted in this research using the purposive sampling approach, which was appointed explicitly by MUI to join in this research because they did not yet have halal certification. Faqiri *et al.* (2019) stated that purposive sampling judgment was used to identify information in detail on SMEs based on government bodies' policy and decision-makers to understand the entrepreneurs' problems.

Focus group discussion

Data collection was done through filling instruments, and it was conducted by distributing questionnaires about the variables and indicators of HGMP to SMEs in Indonesia through focus group discussion (FGD) activities. The FGD was conducted in collaboration with MUI in this research sample through a workshop on the process of halal certification for SMEs. There are many SMEs invited to workshops to gain an understanding of halal certification. Then, samples were taken from SMEs who were present to fulfill the invitation to the workshop activities. At the end of this section, the questionnaire was filled by guiding SMEs to fill in each question point related to HGMP. In addition, validation of the HGMP framework was carried out in this activity of FGD. Nowell *et al.* (2017) argued that the literature review indicators were validated through FGD with the thematic analysis. FGD method was carried out in Riau Province and is located in MUI Kampar and MUI Pekanbaru. Details of the participants in the FGD activities in these two agencies are found in Table 2.

No.	Participants	Location
1	Auditor of LPPOM MUI Riau	MUI Kampar
2	A representative of Kampar Regency Industry Office	MUI Kampar
3	Kampar representative of MUI	MUI Kampar
4	Auditor of LPPOM MUI	MUI Pekanbaru
5	A representative of the Riau Province Industry Office	MUI Pekanbaru
6	A representative of Riau MUI	MUI Pekanbaru
7	A representative of Riau Public Health Office	MUI Pekanbaru
8	Riau representative of National Agency of Drug and Food Control	MUI Pekanbaru

Table 2. Focus group discussion

Notes: The discussion topics: 1. Concept of halal in Islamic studies. 2. Regulations of GMPs for the food sector in Indonesia. 3. Standard operational procedures for halal quality assurance in Indonesia

Research analysis procedure

Statistical testing was conducted to validate the instrument of the HGMP. There were several tests, including normal tests, validity test and reliability test. Then, the implementation of HGMP was carried out with several stages, including:

Measurement of Halal Good Manufacturing Practices. Measurement of HGMP on SMEs was undertaken through FGD. In this research, the responses to the variables mentioned above were measured on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The criteria used were to determine the level of implementation of HGMP and are found in Appendix. The measurement of HGMP included the value of each variable, the percentage of HGMP for each variable and the overall dealing with the implementation of HGMP. It aims to measure the application of HGMP that has been applied, and then the variables that SMEs must correct in these two agencies. Thus, SMEs find out their performance before proposing halal certification, which stated halal following Islamic law from the MUI. The standardization of these results is adjusted based on research on GMPs in Indonesia (Anggraini and Yudhastuti, 2014; Rudiyanto, 2016), which is found in Table 3.

Measurement of HGMP in this case study was described in formulas 1, 2 and 3. The determination of variable value was presented within row i and column j on matrix X. Then, HGMP per variable was shown on matrix Y. Finally, the overall HGMP was given on matrix Z. Subsequently:

(a) is the number of variables;

(b) is the number of indicators; and

(c) is the number of small business enterprises (SMEs).

1. Variable value (X)

$$X : \left(\sum_{j=1}^{b} \left(\sum_{i=1}^{c} M_{ij} \right) \right)$$

GMP score	Criteria
>75%	Excellent
65%-75%	Good
55%-<65%	Moderate
<55%	Poor

Table 3. Overall GMP

2. HGMP per variable (Y)

$$Y\ (\%) = \frac{1}{a\ x\ b\ x\ c}\left(\sum_{j=1}^{b}\left(\sum_{i=1}^{c} M_{ij}\right)\right) \times 100\%$$

3. Overall HGMP (Z)

$$\mathrm{Z}\ (\%) = \frac{1}{a}\left(\sum_{k=1}^{a}\frac{1}{a\ x\ b\ x\ c}\left(\sum_{j=1}^{b}\left(\sum_{i=1}^{c} M_{ij}\right)\right) \times 100\%\right)$$

Mann–Whitney U-test. The Mann–Whitney U-test was carried out to determine the impact of the HGMP variable on the performance of SMEs at two different agencies. Furthermore, this result indicates the significance value or asymp sig. (two-tailed) must be less than 0.05. Thus, the hypothesis is accepted, which means that there is a significant difference between the SMEs variables in these two agencies. Petković and Sorak (2019) examined the level of business policy differences by implementing Mann–Whitney U-test. This research finds out that entrepreneurial orientation is one of the ways to improve the business success of SMEs using Mann–Whitney U-test.

Findings

Respondents' profile

This research obtained 73 SMEs in the food sector with categories consisting of the number of employees, types of products and years of establishment in Riau province. This data collection of two regency locations in Riau included 41 SMEs of MUI Kampar and 32 SMEs of MUI Pekanbaru, which is shown in Table 4. Besides, three criteria of SMEs in this research did not yet have halal certification, including convenience food, traditional food and bakery. Pekanbaru is a capital city where many SMEs have received halal certification compared to Kampar. SMEs' profile based on the number of employees shows that SMEs' guidance in MUI Kampar, which has large-scale businesses, has not yet proposed halal certification. For SMEs' guidance in MUI Pekanbaru, many medium-scale businesses do not yet have halal certification. Profile of SMEs based in MUI Kampar product groups, many traditional foods need to propose halal certification. In contrast, MUI Pekanbaru shows that there are many bakeries to submit this certification. Moreover, the SMEs in this research discovered that the establishment is still under five years.

This research instrument consisted of 40 indicators, which were divided into 6 assessment variables of HGMP. The initial stage of data analysis is to conduct the validity test with the requirement that the r count's value is higher than the r table. The validity test result for these two locations was found to be valid because all point instruments were more significant than 0.3. Furthermore, the reliability test undertaken by fulfilling the Cronbach's alpha value requirement must be greater than 0.6, with each value pointed out that the MUI Kampar was 0.882 and Pekanbaru was 0.900. Then, the normality test was carried out because the significance value was more significant than 0.05. The result of the significant value in MUI Kampar was 0.671 and MUI Pekanbaru was 0.824. Thus, it was concluded that both data had a normal distribution.

Profile	Criteria	MUI Kampar $n = 41$ (%)	MUI Pekanbaru $n = 32$ (%)
Size (number of employees)	Less than 4	29	19
	5-7	32	47
	8-10	39	34
Type of product	Convenience food	19	31
	Traditional food	66	25
	Bakery	15	44
Years of establishment	Less than 3	46	41
	4-5	25	38
	6-10	29	22

Table 4. Respondents' profile

Notes: Profile of SMEs: Convenience food includes cafeteria and catering; traditional food includes satay, meatballs and miso; and bakery includes bread, cakes and crackers

Implementation of Halal Good Manufacturing Practices

The implementation of HGMP in the food sector at two locations was carried out on variable buildings, facilities, employees, production, storage and maintenance. Figure 1 is an implementation of HGMP in this case study.

Figure 1 shows that overall the implementation of HGMP of SMEs of MUI Pekanbaru is better than the MUI Kampar. In MUI Pekanbaru, the maintenance variable reached 61.55% for SMEs. It means MUI under the guidance of MUI Pekanbaru has a great concern for the maintenance variable in the form of cleaning activities from the environment, business place, transportation of raw material, toilet, washing hand and raw material and production sites. However, the variable facility is the lowest because the supporting equipment for these SMEs does not meet the standard. For the MUI Kampar, the implementation of HGMP

No	Variable	Indicator	*Halal Good Manufacturing Practices (HGMP)* Scoring			
			MUI Kampar		MUI Pekanbaru	
			SMEs (n = 41)	HGMP (%)	SMEs (n =32)	HGMP (%)
1	Building	9	948	42.82%	973	56.31%
2	Facility	6	598	40.51%	536	46.53%
3	Employee	7	850	49.36%	763	56.77%
4	Production	5	620	50.41%	482	50.21%
5	Storage	7	925	53.72%	653	48.59%
6	Maintenance	6	712	48.24%	709	61.55%
Overall HGMP			47.51%		53.32%	

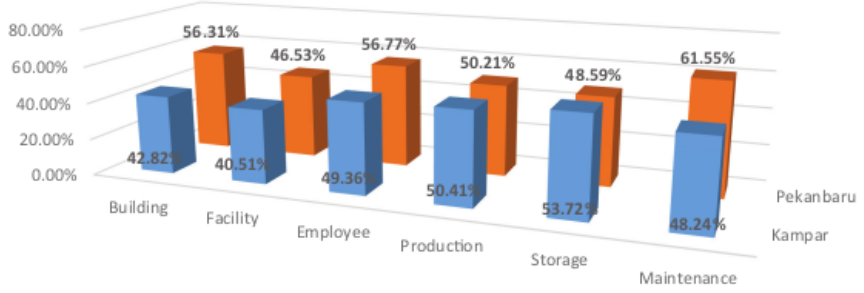

Figure 1. Implementation of HGMP

overall was 47.51%. The storage variable is better in other variables because the manager of SMEs already has a good level of awareness in this management.

Level of business policy

MUI Kampar and MUI Pekanbaru were under the coordination of MUI in the province of Riau. These two institutions coordinate with MUI Riau as the institution that issues the halal certification. Thus, this requires identifying the level of difference in business policy in these two locations to carry out the guidance to SMEs in the food sector. The test was done through the Mann–Whitney U-test and is shown in Tables 5–7.

Table 7 shows that the building variable had a U-value of 242 and a W-value of 1103. If it is converted to Z so then the value is −4.608. Then, It has a level of significance is 0.000. If the level of significance or *p*-value is below 5 percent (0.05), the null hypothesis can be rejected. Thus, there are significant differences between the two groups, or it implies that *H1* is accepted. Several variables that differ significantly between MUI Kampar and MUI Pekanbaru on the policy of HGMP are building, employees, storage and maintenance.

Discussion and implication

The framework of HGMP in the food sector found out 6 variables and 40 indicators to be used in this case study. Government, MUI and SMEs are entities that are related to the implementation of HGMP. The integration of these three entities in the HGMP strategy is shown in Figure 2.

Table 5. Descriptive statistics of HGMP

	MUI Kampar					MUI Pekanbaru				
Variable of HGMP	Mean	Median	SD	Min	Max	Mean	Median	SD	Min	Max
Building	23.12	23.00	6.43	11.00	35.00	30.40	31.00	5.22	17.00	41.00
Facility	14.58	14.00	3.82	8.00	23.00	16.75	16.00	4.42	11.00	26.00
Employee	20.73	20.00	4.77	15.00	33.00	23.84	23.00	4.76	14.00	32.00
Production	15.12	16.00	3.45	8.00	22.00	15.06	15.00	4.17	8.00	22.00
Storage	22.56	24.00	5.48	11.00	31.00	20.40	20.50	4.75	12.00	30.00
Maintenance	17.36	17.00	4.62	10.00	27.00	22.15	23.50	5.31	10.00	29.00

Table 6. Ranks comparison of GMPs

Variable	Agency	N	Mean rank	Sum of rank
Building	MUI Pekanbaru	32	49.94	1598.00
	MUI Kampar	41	26.90	1103.00
Facility	MUI Pekanbaru	32	42.00	1344.00
	MUI Kampar	41	33.10	1357.00
Employee	MUI Pekanbaru	32	44.52	1424.50
	MUI Kampar	41	31.13	1276.50
Production	MUI Pekanbaru	32	36.75	1176.00
	MUI Kampar	41	37.20	1525.00
Storage	MUI Pekanbaru	32	31.45	1006.50
	MUI Kampar	41	41.33	1694.50
Maintenance	MUI Pekanbaru	32	47.63	1524.00
	MUI Kampar	41	28.71	1177.00

Building

The building is an essential factor for sustainability in the food industry. Other studies also indicated that the construction of the building considers the sanitation process (Kumar, 2015; Sucipto *et al.*, 2020). Thus, the sanitation process has an impact on product quality because water, air and waste sanitation are related to building equipment. Energy is also used for building construction that affects productivity and efficiency in production (Landin and Oberg, 2014). Moreover, Islamic law in the Al Quran in surah Al-Anfal verse 11 explains that the sanitation management process is needed to keep the workplace and the

Table 7.
Test statistics output of Mann–Whitney U-test

	Building	Facility	Employee	Production	Storage	Maintenance
Mann–Whitney U-test	242.000	496.000	415.500	648.000	478.500	316.000
Wilcoxon W	1103.000	1357.000	1276.500	1176.000	1006.500	1177.000
Z	−4.608	−1.786	−2.682	−0.089	−1.978	−3.786
Asymp. sig. (2-tailed)	0.000	0.074	0.007	0.929	0.048	0.000

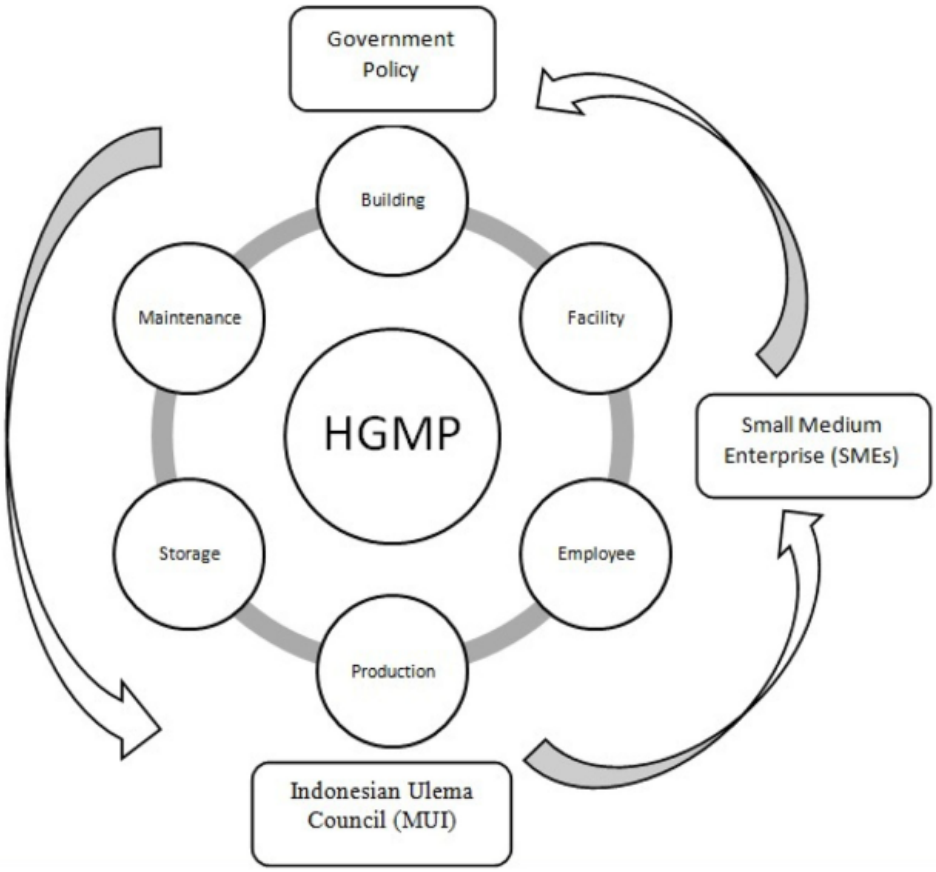

Figure 2.
The framework of HGMP in the food sector

environment clean. Furthermore, this material focuses on the management of rain and water sources for cleanliness in a building. Then, Islamic law states that waste management is not allowed in places where water does not flow. Wastewater is unclean, polluted, and dangerous. Thus, it will threaten the health of most people. However, production activities require a source of clean water and are used to clean production facilities. Thus, a building must be provided with an appropriate waste disposal site and the places must be kept at a distance from people who are working. In this research, the building variables at the SMEs in MUI Pekanbaru are better than to MUI Kampar. Therefore, the access way to the SME still has a lot of hardening and rocky roads while the SMEs in Pekanbaru are dominant asphalt roads. Then, there are still many SMEs in Kampar that do not have ceilings in their buildings. In addition, many of the doors in SMEs in Pekanbaru are using stainless steel. Besides, this is in line with the results of the Mann–Whitney test that has been carried out with the conclusion that SMEs Kampar and Pekanbaru have significant building aspect comparison.

Facility

Facilities in this research include distribution equipment, transportation and removal, the location of the toilet, hand washing facilities, waste and water sources. This facility is related to material handling and the cleanliness of the workplace. Ali Naqvi *et al.* (2016) stated that the design of good material handling facilities increases work productivity. Then, Møretrø and Langsrud (2017) argued that clean facilities avoid sources of bacteria specifically for food industries in which it has many sources of raw materials and high product variants. Al Quran Surah Yunus verse 59 and al-A'rāf verse 32 explain that Islamic law recognizes that there are products that can be consumed (halal) and those that are prohibited from being consumed (haram). If halal and haram are mixed, the Islamic law that is taken is non-halal (haram). This rule is adopted because a processed product cannot be mixed with halal and haram in substances (raw materials) and their processes. To overcome this, regulations or procedures are needed for business actors to protect good consumers and producers. Contamination with haram elements is avoided in the concept of Islam. Thus, in the processing, storage, handling and packaging techniques, preservatives that are harmful to health or additives that contain haram elements are often used, which are prohibited in Islam. In principle, halal or non-halal (haram) is not only concerned with the problem of using materials, but also in facilities in the production process, distribution facilities, transportation and storage. The separation of groups of halal and non-halal (haram) products actually does not only apply to products but also starts from the facilities in the sales process, warehouse, distribution facilities and transportation to the freezer. In this case study, the facilities on the SMEs in MUI Pekanbaru are slightly better than the SMEs at Kampar. However, it does not differ significantly according to the Mann–Whitney test that has been carried out. Therefore, the transportation tool used to purchase raw materials and sales of products still use a lot of motorcycles. Then, the way to handle waste is only combined in one right, and it is destroyed directly without being sent to a landfill or recycled to be used for other purposes. Furthermore, the thing that most distinguishes SMEs in these two locations is that the toilet building at SME in Pekanbaru has been widely separated from production building so that it is better to maintain the cleanliness of employees and the result of production.

Employee

The employee is one of the things that play an essential role in the production process because of direct contact with raw materials and finished products. Educational background

and work experience affect employee performance. Work experience accustoms the employees to follow the standard operating procedures (De Treville *et al.*, 2005). Further, the work safety and health affect the production system to keep it running according to its schedule (Moatari Kazerouni *et al.*, 2012). Work accident can delay production activities and disrupt the work system. Islamic law in the Al Quran in surah An-Nisa verse 43 and Al-Maidah verse 6 explains that people in sick condition must pay attention to their health and those around them. This aims to protect oneself so that the disease does not get worse and does not spread to other people. Furthermore, Islamic law does not want to make it difficult for workers to continue their activities. Thus, even in a sick condition, personal hygiene and workplace are the main concern so as not to disturb the workplace environment. If you are unable to keep the disease clean, it is advisable to cover yourself with personal protective equipment and maintain contact with other workers. Based on the test of Mann–Whitney U-test, the employee variables at SMEs in MUI Kampar and MUI Pekanbaru have significant differences. SMEs of MUI Kampar still do not provide work equipment for employees such as gloves and masks. The health of employees at SMEs in MUI Pekanbaru is better than those who are at Kampar because the employees who work at SMEs must be in a fit condition while the employees in Kampar are still allowed if the employees are unhealthy.

Production

The food industry is a category of the process industry. It is because the process of production is carried out continuously. There are many raw materials mixed to produce finished products using several machines. Thus, the production system affects the quality and quantity of the product (Albrecht *et al.*, 2019). Inappropriate selection of raw materials affects the production system. As a result, the final product does not follow the desired quality. Then, Zakaria *et al.* (2017) explained that the selection of product packaging and the mechanism of product expiration become the quality standard for halal products. Islamic law in the Al-Quran in surah al-Baqarah verse 173 and al-An'ām verse 145 explains that it is prohibited to consume food sourced from animal carcasses, flowing blood and pork because, in fact, all of them are not good for health. Then, it is also forbidden to kill animals that are not slaughtered according to Islamic procedures. Islam recommends using a sharp slaughtering tool that is able to cut the respiratory tract and food tract and remove blood. Pork should not be consumed because some experts say that these animals eat their own feces. This condition has an impact on the health of the meat and other elements in it. This reason makes it forbidden to consume pork. Then, animal carcasses are not allowed to be consumed because after death, metabolism in animals will stop. This causes the emergence of various germs contained in it. There are two types of blood including flowing blood and non-flowing blood. The blood that is forbidden is blood that flows. While the blood that does not flow, such as the liver, spleen and blood that is left in the tendon can be eaten. Production based on the Mann–Whitney test does not have a significant difference between SME in Kampar and MUI Pekanbaru. It is in line with the value of HGMP implementation, and it is not much different, namely, 50.41% and 50.21% because SMEs are still traditional by using human labor. Besides, in terms of packaging, it is already good because it is made from durable, safe and harmless material. Furthermore, SMEs know that the process of production is based on hereditary and electronic media.

Storage

The media of product storage affects the durability of the product because the product is not durable. It aims to delay the decay process. Ab Rashid and Bojei (2020) mentioned that the selected product storage was an advantage in the production system. This storage is also

related to the management of the factory layout. Ahmad Radzi *et al.* (2016) argued that efficient layouts in industries separate the storage of raw materials and finished materials. Thus, product flow in the production system is not chaotic, and it increases industrial productivity. Al Quran in Al Baqarah verse 279 explains that expired products can persecute consumers. Thus, producing a product needs to consider the needs of consumers and producers because expired products can harm or endanger human health. Islamic law also describes in Surah Shad verse 26 the importance of legal protection for consumers of food consumed. Business actors must provide products by implementing the principles of honesty, fairness and openness to avoid harm and abuse to consumers. Based on the Mann–Whitney test, the SMEs at MUI Kampar and MUI Pekanbaru have a significant storage aspect comparison. MUI Kampar is better compared to MUI Pekanbaru. One of the factors is the storage space of SMEs in MUI Pekanbaru is still inadequate.

Maintenance

Variable maintenance in this research is related to the cleanliness of the workplace. It includes environmental hygiene, business place, transportation of raw material, toilet, hand washing and location of raw material and product. de Jonge and Scarf (2020) declared that maintenance was divided based on preventive and corrective measures that were able to schedule the production activities to be carried out periodically. This scheduling aims to reduce risks during the production process, such as machinery breakdown, delay of production and work accidents (Bourassa *et al.*, 2016). Facilities are everything that can be used as a tool or media to achieve goals. Then, infrastructure is all basic equipment that indirectly supports the implementation of activities. Islamic law through the Al Quran in surah Al-Isra verse 84 explains that anyone who performs an activity will do it according to their circumstances and their natural surroundings. This explains that carrying out an activity requires media to achieve goals. Then, Al Quran Surah An-Nahl verse 81 explains that facilities and infrastructure are used to guard and protect from various threats. Thus, the maintenance of facilities and infrastructure is needed in carrying out activities to achieve goals.

Based on maintenance in this case study, the SMEs at Pekanbaru MUI are better than the SMEs at MUI Kampar. It is found that the highest percentage of aspects is maintenance aspects in MUI Pekanbaru by 61.55%. SMEs are better at keeping the workplace to be clean by employees and their management. Moreover, the implementation of HGMP in MUI Kampar as a whole is 47.51%, which is categorized as poor. Then, the application of HGMP in MUI Pekanbaru is 53.32%.

Practical implication

MUI Kampar and MUI Pekanbaru in this research are categorized as poor because the scoring of HGMP is below 55%. The interpretation of these results indicates that it is necessary to increase the implementation of HGMP in the food sector by MUI Kampar and MUI Pekanbaru. Both of these agencies must develop appropriate strategies of guidance to improve six variables of HGMP on the food of SMEs. Matsuda *et al.* (2019) stated that the values of GMP were increased gradually through a strategy conducted by business managers. For policymakers, the government raises its role in giving guidance by focusing on six variables that have been selected. Then, the capital assistance scheme through research and assistance is directed in the development of SME production facilities. Pasban and Nojedeh (2016) emphasized that the increase in human capital is better than investment in production assets. Therefore, human resources have a vital role in increasing the productivity of the industry.

Obviously, this case study concludes that SMEs in two government agencies need to be upgraded toward halal product quality standards. Currently, the GMP approach does not meet the paradigm and criteria of Muslim consumers. To meet the gap of study, it is necessary to extend the concept of GMP to HGMP in increasing global consumer satisfaction. Thus, government agencies in Indonesia are able to measure the implementation of HGMP in food sector SMEs and also provide guidance to SMEs to achieve halal quality standards. The HGMP framework for the food sector in SMEs in Indonesia is expected to measure the implementation of the halal concept in fulfilling consumer satisfaction and increase market expansion not only for Muslims but also non-Muslims who can consume halal products.

The framework for the measurement of HGMP in the case of SMEs in the food sector in Indonesia has been implemented in this paper. The results of the study show that the 6 variables and 40 indicators that have been built are influenced by the social and culture of business actors in Indonesia because the operational strategies of the business processes in SMEs on the food sector are implemented based on the paradigm of business actors in running their business. Several studies have also concluded that the paradigm of business actors in compiling a business strategy is built on a social and cultural approach (Maksum *et al.*, 2020; Westman *et al.*, 2019). Furthermore, this paradigm of business actors has also been developed because of government regulations regarding GMP standards. Thus, the strategy and production facilities for SMEs in Indonesia follow GMP standards. Indeed, the limitation of the study found that it is necessary to conduct a study of HGMP in several countries based on regulations issued by their governments.

Conclusions

The implementation of HGMP helps SMEs maintain the quality of their products to serve consumers, not only Muslims but also non-Muslims who can consume halal products. This research provides an approach to measure the implementation of HGMP for SMEs in the food sector in Indonesia. Thus, the Indonesian Government, through MUI, carries out guidance to SMEs to achieve the standardization of the halal guarantee system. Furthermore, this valuable research is generalized to encompass all conditions for food products. Therefore, it needs to be modified based on the type of food business outside the sample size in this research. Moreover, the implementation of the HGMP is examined in this research based on the regulation of government. It has not been thoroughly tested based on consumer responses. Further study is suggested to consider consumers' needs toward the perception of halal products in choosing consumption products.

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Appendix

Table A1.
HGMP scoring form in food sector

Variable	Indicator	Scoring 1	2	3	4	5
Building	Road	Hardening road	Rocky road	Cement road	Pavement road	Concrete road
	Wall	No wall	Plywood	Wood	Bricks	Segmentation
	Floor	Soil	Wood	Cement plaster	Rugh marble	Ceramics
	Ceiling	No ceiling	Plywood	Wood	Gypsum	Concrete
	Door	No door	Wood	Plastic	Stainless	Glass
	Window	No window	Wooden window and wooden frame	Glass window and wooden frame	Glass window and fiber frame	Glass window and stainless frame
	Air circulation	No ventilation	It has ventilation but not completed with the tool for preventing the entrance of insect	It has ventilation and complete with tools for preventing the entrance of insect	It has ventilation and fan	It has air condition
	Lighting	Sunlight	Incandescent lamp	Yellow fluorescent lamp	White fluorescent lamp	White LED lamp
	Spatial	Irregular	Arranged based on beautiful aesthetics	Arranged based on the stages of product producing process	Arranged based on equipment type	Arranged based on consultant's suggestion
Facility	Distribution tools	Two-wheeled vehicle	Three-wheeled vehicle	Pick-up car	Truck car	Box car
	Transportation and transfer	The business place has limited room	Direct contact with the human body	Moved by human energy by using container media	Cart	Trolley
	Toilet location	No toilet	Merged with production place	Side by side with the production place	Separated but close to the production place	Separated far away from the production place
	Hand wash facility	Directly use the water faucet	Water faucet and hand towel	Sink and hand towel	Sink, soap and hand towel	Sink, soap, hand towel and dryer
	Waste	Combined in one place and destroyed	Combined and sent to landfill	Separated based on the type and destroyed	Separated based on the type and sent to the landfill	Separated based on the type and recycled
	Water source	River water	Rainwater	Well water	Water from springs	Depot water
Employee	Education	Elementary school graduate	Junior high school graduate	Senior high school graduate	Diploma three (D3) graduate	Bachelor graduate

(*continued*)

Table A1.

Variable	Indicator	Scoring 1	2	3	4	5
	Recruitment	All employees are non-Muslims	The majority of employees are non-Muslims	Total Muslim and non-Muslim employees are equal	The majority of employees are Muslims	All employees are Muslims
	Training	No information is given	Training of working procedures	Training of working procedures and cleanliness	The practice of work procedure, health and safety	Work procedure training, health, safety and regular training
	Health	Employees are allowed to work or have a dangerously infectious disease	Permanent employees are allowed to work when suffering from cough	Permanent employees are allowed to work when suffering from flu	Permanent employees are allowed to work when suffering from an open wound at the body part	The employees must be healthy
	Equipment	No work equipment	Only providing gloves	Providing mask and gloves	Providing mask, gloves and headgear	Providing mask, glove, headgear and uniform
	Work attitude	The employees smoke during the work	Before working, employees do not wash their hand	The employees eat and drink during the work	The employees keep themself and the work environment clean	Employees work following the standard operating procedure determined by the business place
	Health examination	The business place never do a health check on the employees	The business place conducts health check on the employees if there is a complaint	The business place conducts health check once a year	The business place conducts health check once a month	The business place conducts health check on employees every day before doing the production
Production	Tools and types of equipment	Purely using human power	Using second-hand equipment	Using traditional equipment	Using a semi-automatic machine	Using automatic machine
	Raw materials	Using raw material from the business around the house	Using self-made raw materials	Using raw materials from traditional market	Using raw materials from the supermarket	Using raw materials from certified suppliers

(*continued*)

Table A1.

Variable	Indicator	Scoring 1	2	3	4	5
	Expiry	No expiry date in the product	Putting the expiry date for some products	Putting expiry date and not retracting the expired product	Putting expiry date and retract the expired product	The food product is directly processed and sold to the consumer
	Policy	The business owner knows the production process based on the recommendation from the working partner	The business owner knows the production process from generation to generation	The business owner knows the production process based on electronic media	The business owner knows the production process based on socialization from the government	The business owner knows the production process based on the education process
	Packaging	The product package is made of easily damaged material	The product package is made of safe material but easily damaged	The product package is made of safe material	The product package is made of safe and durable material	The product package is made of safe and durable material and not dangerous
Storage	Location	No storage room	The storage room merges with the production room	The storage room is separated from the production room	The storage room is separated but close to the production room	The storage room is side by side with the production room
	Wide	No storage room	There is a storage room but not enough	There is a medium size storage room	There is one large storage room	There are two extremely large storage rooms
	Storage place	Open	Half-open	There is temperature control	Closed	Hermetic
	The need for raw materials	The raw material purchase is unscheduled	The raw material is bought everyday	The raw material is purchased if it will be used	The material purchase is following the business target	The material purchase follows the schedule
	Storage of raw materials and product	No storage room	Combined and saved in one same room	Separated based on the material type and saved in the same room	Separated based on total stock available and saved in the same place	The room for saving the material and production result is separated

(*continued*)

Table A1.

Variable	Indicator	Scoring 1	2	3	4	5
	Equipment	Not cleaned	Cleaned by using water	Cleaned by using water and then saved	Cleaned by using water and soap but not saved	Cleaned by using water and soap then saved
	The place halalness of raw materials and the product	Halal and proscribed products are saved in one place	The storage room of halal product was used for the storage of proscribed (haram) product	The product is saved by using preservative	Halal and haram products are saved separately	Only keeping halal product
Maintenance	Environmental cleanliness	There is much garbage in the environment	The dining room is close to the sink	There are many landfills	Providing trash can for wet garbage and dry garbage	The business place has complete cleaning equipment
	The cleanliness of the workplace	Stagnant water is found in the business place after the rain	The business place is quickly moldy	There are many spider web in the corner of the business place	There is soil dirt on the floor of business place	The business place and equipment are dusty
	The cleanliness of the raw material vehicle	The vehicle of the raw materials do not have cover	The check on the vehicle of raw material was done regularly	The driver of raw material transportation knows the cleanliness standard	The vehicle of raw materials are always cleaned after doing the delivery	The vehicle of raw materials is completed with the temperature control
	Toilet cleanliness	No toilet	The toilet has an air freshener	The toilet has a trash can	The toilet has cleaning material	Toilet has cleanliness equipment
	Handwash cleanliness	Handwash facility is also used as the place for doing the dishes	Wiping by using a dry duster	Rinsing the handwashing facility after using	Rising by using warm water	Cleaned by using cleanliness tools
	Place cleanliness of raw materials and the product	The storage place is not maintained	The maintenance is conducted by installing rat deterrent and other animals	The maintenance is conducted by using insect and bacteria destroyer	The maintenance is conducted after the employees use the storage place	The maintenance is conducted by a particular employee every single day

About the authors

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